Subroto Kumer Deb Nath

Firmware Engineer | FPGA Developer | ASIC Developer | Embedded Systems Engineer

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Education

University of Calgary, Canada September 2022 – January 2025
Master of Science in Electrical Engineering GPA: 4.0/4.0
Relevant Coursework: Embedded Systems, Hardware Design, ASIC Design, Machine Learning

Khulna University, Bangladesh January 2012 – June 2016
Bachelor of Science in Electronics and Communication Engineering GPA: 3.09/4.0
Relevant Coursework: Digital and Analog Electronics, Firmware, Wireless Communication

Skills

Languages: C, Embedded C, Verilog, SystemVerilog, C++, Python, Assembly, TCL, MATLAB
Microcontroller: STM32, STM8, ESP32, PIC, AVR, N76E003, Intel 8051
MCU Peripherals: I2C, UART, SPI, QSPI, CANbus, Modbus, USB, JTAG, SWD, IR, Bluetooth
MCU Features: Timers, ADC, DAC, PWM, Interrupt, DMA, CRC, TRNG, FPU, DSP, LVGL,
Boot Mode, Low-Power, Clock PLL, CTMU, User Interface, Sensor Integration
Firmware: Bare-Metal, HAL API, FreeRTOS, Zephyr RTOS
FPGA: Altera, Xilinx, Lattice Platform
Schematic and PCB Layout: KiCad, Altium Designer
OS: Windows, Linux, MacOS
Hands-on: Soldering (THT, SMD, and BGA), PCB Troubleshooting, Debugging, Prototype Design
Lab Equipment: Oscilloscope, Function Generator, Logic Analyzer, Multimeter, Power Supply
Tools and Technologies: GitHub, MS Office, Trello, Confluence, VMWare

Professional Experience

University of Calgary, Canada June 2025 – Present
Research Assistant (Part-Time)
• Researching automatic asset identification in Verilog/SystemVerilog hardware designs.
• Developing Python-based automation tools for Asset Identification and downstream security analysis of RTL code.
• Developing DRAM Controller and Multi-Cycle RISC-V Processor on Intel Pathfinder FPGA.
• Collaborating with academic supervisors and peers to refine research outputs and improve tool accuracy.

University of Calgary, Canada September 2022 – December 2024
Graduate Teaching Assistant
• Conducted lab sessions and tutorials on Verilog-based FPGA programming, guiding students through RTL design, simulation, and implementation on hardware platforms.
• Facilitated hands-on Firmware development with STM32 and PIC microcontrollers, teaching embedded systems programming using C and real-time debugging techniques.
• Mentored students in hardware-software integration projects, emphasizing low-level programming, peripherals and sensors interfacing, and real-world system prototyping.
• Helped professors in course development and grading the assignments and projects.

Walton Digi-Tech Industries Limited, Bangladesh June 2018 – August 2022

Research and Development Engineer, Team Lead

• Led a cross-functional R&D team of hardware and firmware engineers, driving product development from the planning stage to manufacturing-ready products, improving collaboration efficiency by 20% and accelerating innovation cycles.

• Developed and optimized firmware solutions for computers, computer peripherals, and digital consumer products, reducing system errors by 15% and enhancing overall reliability throughout the product's lifecycle.

• Supervised schematic and PCB layout design teams, design and code review of the teams, guiding component selection and protocol optimization to achieve cost reductions and enhanced performance in product development.

• Coordinated with China and Taiwan suppliers/partners, securing bilateral NDAs and protecting IP (design docs, SDKs, tools), resulting in faster time-to-market**.**

• Managed post-development certification and licensing processes with regulatory bodies, ensuring 100% compliance with international safety standards.

• Prepared production SOPs and repair/troubleshooting guides, enabling the production team to increase capacity by 15% and improve after-sales service efficiency.

• Developed and executed detailed test plans with reliability analysis, raising product quality and reducing defect rates by 12% across product lines.

• Performed fault analysis across development, production, and aftermarket phases, implementing corrective actions that cut recurring issues by 20% in subsequent revisions.

Projects

Automatic Asset Detection Tool in RTL Code (2025)

- Developed an automatic asset detection tool in Python for Verilog/SystemVerilog RTL, enabling identification of security-critical signals across complex SoC designs.
- Automated CIA classification of assets based on signal behavior and hierarchy, reducing manual analysis effort and potential human error.

Technical Lead – Tablet Project, National Population & Housing Census Project, Bangladesh (2022)

- Supervised development and production of 395,000 Android tablets, ensuring large-scale deployment success.
- Optimized OS installation, device enrollment, and production workflows, reducing overall production time by 4%.
- Managed Google licensing compliance and led MIPI based display integration, developed power-cycle firmware.

Firmware Engineer – DOEL Laptop Project, Government of Bangladesh (2019–2020)

- Collaborated with the BIOS customization team to tailor firmware for project requirements.
- Developed OEM BIOS flashing, Microsoft OS license integration, and serialization tools to streamline the client's production line.

Project Coordinator – Android Tablet Development Project, Shenzhen, China (2019)

- Coordinated development of the initial Android tablet model with Alldocube Science & Technology Co., Ltd.
- Worked closely with Alldocube's R&D and management teams to align design and production goals.

Firmware Engineer – EVM Monitor Project, Bangladesh National Election (2018)

- Developed firmware for an **HDMI-enabled monitor** used in the national Electronic Voting Machine system.
- Created an optimized **firmware flashing tool** for the production line, improving efficiency and reliability.

Achievements

- Alberta Innovates Graduate Student Scholarship in 2024.
- Alberta Graduate Excellence Scholarship (AGES) – International in 2023.
- 2nd Place, 6th HACK@DAC Hardware CTF Security Competition in 2023.
- International Graduate Tuition Award (2022-2024)